

What is claimed is:

1. A polymer blend of at least three copolymers comprising:
a first polymer having a melting point between 55 to 75°C comprising a copolymer of ethylene and at least one α -olefin;
a second polymer having a melting point between 85 to 110°C comprising a copolymer of ethylene and at least one α -olefin; and
a third polymer having a melting point between 115 to 130°C comprising a thermoplastic polymer.

2. A polymer blend, as defined in claim 1, wherein said third polymer is selected from the group of a copolymer of ethylene and at least one α -olefin, LDPE, HDPE, and propylene copolymers.

3. A polymer blend, as defined in claim 1, wherein said third polymer comprises a copolymer of ethylene and at least one α -olefin.

4. A polymer blend, as defined in claim 1, further comprising a fourth polymer having a melting point between 80 to 105°C.

5. A polymer blend, as defined in claim 1, further comprising a fourth polymer having a melting point between 90 to 100°C.

6. A polymer blend, as defined in claim 4, wherein said fourth polymer comprises a copolymer of ethylene and a vinyl ester or alkyl acrylate.

7. A polymer blend, as defined in claim 1, wherein said first polymer and said second polymer comprises an interpolymer.

8. A polymer blend, as defined in claim 1, wherein said first polymer and

said third polymer comprises an interpolymer.

9. A polymer blend, as defined in claim 1, wherein said second polymer and said third polymer comprises an interpolymer.

5 10. A polymer blend, as defined in claim 1, wherein an interpolymer comprises at least two of said first, second and third polymers.

11. A flexible film having at least one layer comprising said blend of claim

12. A flexible thermoplastic film having at least one layer comprising a blend of at least three polymers comprising:

a first polymer having a melting point between 55 to 75°C comprising a copolymer of ethylene and at least one α -olefin;

a second polymer having a melting point between 85 to 110°C comprising a copolymer of ethylene and at least one α -olefin; and

a third polymer having a melting point between 115 to 130°C.

20 13. A polymer film, as defined in claim 12, wherein said third polymer is selected from the group of a copolymer of ethylene and at least one α -olefin, LDPE, HDPE, and propylene copolymers.

25 14. A film, as defined in claim 12, wherein said third polymer comprises a copolymer of ethylene and at least one α -olefin.

15. A film, as defined in claim 12, further comprising a fourth polymer having a melting point between 80 to 105°C.

16. A film, as defined in claim 12, further comprising a fourth polymer

having a melting point between 90 to 100°C.

17. A film, as defined in claim 15, wherein said fourth polymer comprises a copolymer of ethylene and a vinyl ester or alkyl acrylate.

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18. A film, as defined in claim 12, further comprising at least one other thermoplastic layer.

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19. A film, as defined in claim 12, wherein said blend containing layer has been irradiatively crosslinked.

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20. A film, as defined in claim 12, wherein said layer is the innermost heat sealable layer of a tube formed of said film.

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21. A film, as defined in claim 12, wherein said film is fabricated into bags.

22. A film, as defined in claim 18, wherein said additional layer comprises a gas barrier layer having an oxygen transmission of less than 15 cc/100 in² for 24 hrs. at 1 atm.

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23. A film, as defined in claim 18, wherein said film is a tubular multilayer film formed by coextrusion or coating lamination and said blend comprises a heat sealing layer which is the innermost layer of said tube.

24. A film, as defined in claim 12, wherein said film is biaxially stretched.

25. A film, as defined in claim 12, wherein said film is heat shrinkable at 90°C.

26. A film, as defined in claim 25, wherein said film has at least 30% shrink in at least one direction at 90°C.

5 27. A film, as defined in claim 12, wherein said blend comprises at least 50 percent by weight of a heat sealing layer.

28. A polymer blend, as defined in claim 12, wherein said first polymer and said second polymer comprises an interpolymer.

10 29. A polymer blend, as defined in claim 12, wherein said first polymer and said third polymer comprises an interpolymer.

15 30. A polymer blend, as defined in claim 12, wherein said second polymer and said third polymer comprises an interpolymer.

31. A polymer blend, as defined in claim 12, wherein an interpolymer comprises at least two of said first, second and third polymers.

20 32. A biaxially stretched, heat shrinkable film comprising at least three layers, wherein said first layer comprises a blend of at least four polymers comprising: a first polymer having a melting point between 55 to 75°C comprising a copolymer of ethylene and at least one α -olefin; a second polymer having a melting point between 85 to 110°C comprising a copolymer of ethylene and at least one α -olefin; a third polymer having a melting point between 115 to 130°C comprising a thermoplastic polymer; and a fourth polymer having a melting point between 80 to 105°C; a third layer comprising at least 50 percent by weight of copolymer of ethylene with at least one alpha-olefin or at least one vinyl ester or blends thereof; and a second layer between said first and third layers, said second layer comprising a vinylidene chloride copolymer, a nylon or a copolymer of ethylene with a vinyl alcohol.

33. A biaxially stretched, heat shrinkable film, as defined in claim 32, wherein an interpolymer comprises at least two of said first, second and third polymers.

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34. A thermoplastic film of at least two layers comprising, a first layer comprising a first polymer (A) having a melting point between 115 to 130°C and a second polymer (B) having a melting point between 80 to 105°C, and a second layer in direct contact with said first layer without any interposed thermoplastic film layer, said second layer comprising a third polymer (C) having a melting point between 55 to 75°C comprising a copolymer of ethylene and at least one α -olefin and a fourth polymer (D) having a melting point between 85 to 110°C comprising a copolymer of ethylene and at least one α -olefin.

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35. A biaxially stretched, heat shrinkable film comprising at least five layers wherein said first layer comprises a blend of at least three polymers comprising: a first polymer having a melting point between 55 to 75°C, comprising a copolymer of ethylene and at least one α -olefin; a second polymer having a melting point between 85 to 110°C, comprising a copolymer of ethylene and at least one α -olefin; a third polymer having a melting point between 115 to 130°C, comprising a thermoplastic polymer; and optionally a fourth polymer having a melting point between 80 to 105°C; a second layer comprising an ethylene copolymer; a fourth layer comprising an ethylene copolymer; a third layer between said second and fourth layers, said third layer comprising a vinylidene chloride copolymer, a nylon or a copolymer of ethylene with a vinyl alcohol; and a fifth layer comprising at least 50 percent by weight of copolymer of ethylene with at least one alpha-olefin or at least one vinyl ester or blends thereof.

36. A biaxially stretched, heat shrinkable film, as defined in claim 35,

wherein an interpolymer comprises at least two of said first, second and third polymers.

5 37. A process for making a biaxially stretched, heat shrinkable film comprising:

10 extruding a melt plastified primary tube comprising a first polymer having a melting point between 55 to 75°C, comprising a copolymer of ethylene and at least one α -olefin; a second polymer having a melting point between 85 to 110°C, comprising a copolymer of ethylene and at least one α -olefin; a third polymer having a melting point between 115 to 130°C, comprising a thermoplastic polymer; and optionally a fourth polymer having a melting point between 80 to 105°C;

15 cooling said primary tube;

20 reheating said cooled tube to a draw point temperature between about 65 to 88°C ;

25 biaxially stretching said tube to a circumference of at least 2 1/2 times the circumference of said primary tube, and cooling said biaxially stretched tube to form a biaxially stretched, heat shrinkable film.

38. A process, as defined in claim 37, wherein said draw point 20 temperature is between 65 to 79°C .

39. A process, as defined in claim 37, wherein said resultant film has a total energy absorption value E of at least 1.0 joules.

40. A process, as defined in claim 37, wherein said film has a maximum 25 puncture force P of at least 90 Newtons.

41. A process, as defined in claim 37, wherein said film is a monolayer film.

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42. A process, as defined in claim 37, wherein said film comprises at least four additional coextruded layers.

5 43. A process, as defined in claim 37, wherein said film comprises at least one additional coating laminated thermoplastic layer.

44. A process, as defined in claim 37, wherein said biaxially stretched film has at least 30% shrink in at least one direction at 90°C .

10 45. A biaxially stretched, heat shrinkable film, as defined in claim 32, wherein said film has a total energy absorbency of at least 1.0 joules and a maximum puncture force P of at least 90 Newtons.